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Scientific production and characteristics of university teachers of Physical Education in Peru
Producción científica y características de docentes universitarios de Educación Física del Perú

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Abstract

Faced with the problematic scientific production in university teaching in Peru, and the insufficient contribution of publications by teachers, the objective was to determine the frequency of scientific publication of doctors, masters and graduates and to identify the associated factors. For this, an observational, descriptive and cross-sectional study was carried out in a population made up of 165 teachers (135 men with 57.49 ± 3.73 and 30 women 55.75 ± 0.80), the research used the scientific method, the quantitative research approach, the search for articles It was performed in the Google Academic and Scopus database published in the period from (2006 to May 2020), which recorded at least one author with the affiliation and indexed database. 45.19% (61) have a master's degree, 34.07% (46) a doctor's degree, and 20.74% (28) have a professional degree, compared to the female gender 36.67% (11) have a master's degree, 33.33% (10) with a professional title, and 30% (9) with a doctor's degree. The highest percentage of research was carried out by (5) doctors with 25 publications in Scopus, 10 in Web of science, 9 in Pub med, 2 in Scielo and 2 in Latindex. In comparison to the master's degrees, 1 in Web of Science and in Latindex, and 3 teachers have the certification of research professor recognized by the (RENACYT). It is concluded that the frequencies of publications of the physical education university professors with a professional title, masters and doctorates are very low.

Keywords

Teachers; physical education; scientific production

Resumen

Frente a la problemática producción científica en la docencia universitaria en el Perú, y el insuficiente aporte de publicaciones por parte de los docentes, se tuvo como objetivo determinar la frecuencia de publicación científica de doctores, magísteres y licenciados e identificar los factores asociados. Para esto se realizó un estudio observacional, descriptivo y transversal en una población conformada por 165 docentes (135 varones con 57.49 ± 3.73 y 30 mujeres 55.75 ± 0.80), la investigación utilizó el método científico, el enfoque de investigación cuantitativo, la búsqueda de artículos se realizó en la base de datos de Google Académico y Scopus publicados en el periodo del (2006 a mayo del 2020), que consignaron al menos un autor con la filiación y base de datos indexada. El 45.19% (61) tienen el grado de maestría, 34.07% (46) grado de doctor, y un 20.74% (28) con título profesional, en comparación con el sexo femenino 36.67% (11) con grado de maestría, 33.33% (10) con título profesional, y un 30% (9) con el grado de doctor. El mayor porcentaje de investigaciones lo realizaron (5) doctores con 25 publicaciones en Scopus, 10 en Web of science, 9 en Pub med, 2 en Scielo y 2 en Latindex. En comparación a los magísteres, 1 en Web of Science y en Latindex, y 3 docentes cuentan con la certificación de docente investigador reconocidos por el (RENACYT). Se concluye que son muy bajas las frecuencias de publicaciones de los docentes universitarios de Educación Física con título profesional, maestrías y doctorados.

Palabras Clave

Docentes; Educación Física; producción científica

Introduction

Scientific production has core importance at universities and it is related to the country's higher economic development. Scimago Journal & Country Rank (SJR) is a portal that includes a registry of scientific journals that can be used to evaluate and analyze the scientific production and the countries with the highest production of knowledge are: the United States on the top of the list with (12.070.144) published documents, followed by China (5.901.404), United Kingdom (3.449.243), Germany (3.019.959), Japan (2.750.108) and Spain located in tenth place with (1.376.358). In Latin America, the country with the highest scientific production is Brazil (fifteenth's world place) with (938.352) published documents, followed by Mexico (318.095), Argentina (209.294), Chile (147.389), Colombia (99.301) and Peru, that is on the eighth's place within the region and the seventy-third's place world place with (25.175) documents (Scimago, 2020).

Over time, a growing differentiation has been appreciated worldwide in the institutional shape and capabilities of universities. In Latin America, particularly in Mexico, the transformation of their universities toward the development of research and transfer of knowledge capabilities has begun belatedly (Arechavala and Sánchez, 2017). Scientific publications are the tools used by researchers to transmit information. It is about the legitimization of the results obtained. The rapid irruption of electronic scientific magazines confronts the professional with an inexhaustible source of information (Pascual and Martínez, 2010).

The University should assume its elementary function as intellect producer and respond with productivity, efficiency, and efficacy when facing these contemporary challenges; to achieve this purpose it requires a series of conditions that guarantee the development of

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research within itself, through strategies directed towards the promotion of attitudes that favor research activity and that involve teachers, students, graduates, interest groups aware of the problem and society's needs (Barbón and Bascó, 2016). Likewise, encourage the publication of scientific magazines that have been assumed by Latin American Universities, associated with their research missionary function. (Rodríguez, González and Maqueda, 2017).

Scientific research is located at the heart of science. A scientific experiment, as spectacular that its results may be, is not finished until those results are published, because only so, can new knowledge be verified. The most common and worldwide recognized form to carry out this communication has been the publications, in scientific magazines, monographs, or in patents and norms (Rodríguez, González and González 2016). Similarly, scientific disclosure, in the form of scientific articles, is no longer an option and it has been transformed in a necessity for university professors. (Barbón, et al., 2019).

Likewise, limitations exist wherever a sustainable plan of incentives is not in place. Carranza and Turpo (2019) pointed out that investing in research according to UNESCO is 4.7% in Israel, 2.7% in the United States, 1.1% for Brazil, and 0.1% in Peru. This, in the era of knowledge management, makes the topic of research budget to be relegated. A small budget is given to pay research workers, as well as trying to enable laboratories, but there is not a sustainable incentive plan, and if it exists, its execution depends on bureaucratic negotiations.

On the other hand, the structuring of university models is required, which could tie together research and professional and academic education. This constitutes a vital process for these institutions and the contributions to which they are committed in their social context. (Gutiérrez, Peralta and Fuentes, 2019). Furthermore, a positive linear relationship exists between the years of institutional accreditation and the number of Faculty Members that have

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a doctorate, research work, and projects published, and this should favor the accreditation process of Higher Education Institutions (Barra, 2019; Rodríguez et al., 2016).

Peru, in 2014, passed Law N° 30220, University Law, article 48. It points out that research constitutes a University's essential function and obligation, encouraged and carried out, in response to society's needs through the production of knowledge and development of technologies, with special emphasis on the Nation's reality (University Law N°30220, 2014). Within the Law's framework, the University's Superior Education National Superintendence was created, 2016 (SUNEDU), in charge of licensing and supervision of the university's superior educational services, and auditing the use of public funds and benefits that are awarded to the Universities for educational purposes and quality improvement.

In Peru, this particular group has not been investigated, but we have some studies in similar populations, where developing scientific production within Peruvian and Latin American Universities is a priority and a necessity. We found that Peru's participation in scientific work publications in Latin America is 1.1% which represents only 0.05% worldwide (CONCYTEC, 2014); this reduced percentage of participation includes the medical area, which constitutes one of the highest productions at the international level. Therefore, the publication of articles within indexed scientific magazines is a component in the evaluation of the research activity of university professors. Facing that challenge, competition in producing scientific articles acquires a leading role, as the main form of communicating science among scientific communities (Luque, 2015).

Researchers are subjected to multiple scenarios where their academic production is evaluated. Based on bibliometric indicators and the indexing information, consequently, allowing them to detect main magazines, organizations, and authors that have worked on the subject. Starting by studying a group of words, the main lines of investigation becomes evident, standing out amongst them the measurement of the research's productivity. (King, Llinás and Améstica, 2010; Vasen and Lujano, 2017). On the other hand, such degree of agreement amongst the professors does not exist, becoming clear this argument's position: the

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professor's category and academic and research prestige are real indicators of a higher quality of teaching (Hortigüela, Ausín, Delgado and Abella, 2017).

University professors perform an important role as influencers for those undergraduate students doing research, but this influence will be inadequate if they have not done prior research. Students feel more motivated to work research lines if it is led by a professor and more than half of research students refer that their principal motivation to venture into the research world are those model professors with repercussions in the different research areas (Chachaima, Fernández, and Atamari, 2019; Linn, Palmer, Baranger, Gerard & Stone, 2015).

It's necessary to move towards the organization of research groups in defined areas with academic identity composed of working teams that incorporate professionals from different specialties, doctors, biochemists, research resident nurses, as well as other healthcare professionals. The above has been incorporated into some teams at the national level and it is in those where there is evidence of the higher quantity of nominations to research projects, as well as diffusion of knowledge at conferences and an increase in the number of publications (López and Zárate, 2019; Sime, 2017).

The challenge remains to make possible that all this production dialog, research, teaching practice in physical education, sports, and leisure training, putting it at service of the interventions at the court, at the school, at the club, at the plaza, at the gymnasium, amongst many other spaces in which the body and corporal practices play a principal role (Fernandez, Quintão and Bassani, 2017). In the same manner, it is necessary to encourage (scientific) criticism that allows the improvement in writing scientific texts and efficient communication between authors and readers. With that, the commitment is fulfilled that all articles require to be published and understood, aside from increasing scientific knowledge and resolve problems (González and Rubio, 2019).

Finally, the University has both training and research missions; in this sense, the reflections expressed have the purpose to show the limitations of scientific production in Peru

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within the student and professor's context, since it is considered that the scientific production is very important because, through its findings, science is enriched (Barbón and Bascó, 2016). The objective of our study is to determine the frequency of scientific publications amongst Peruvian doctors, masters, and graduates, as well as identifying the associated factors according to the type of database (Academic Google and Scopus) and term of publication.

Material and Method

Research's design

The investigation assumed an observational, descriptive, and transversal design, which had as an objective, to inquire into the incidence of the modalities or the levels of one or more variables in one population (Hernández, Fernández, and Batista, 2006).

Population

The research population was formed by Peruvian Universities that offered a Physical Education Study Program during the 2019 academic year. In which, only were considered for the study, those professors specialized in Physical Education, suppressing professors from other areas,

o.	Universities that offered a Physical Education Study Program	Men	Women	Total
1	Universidad Nacional Mayor de San Marcos	25	5	30
2	Universidad Nacional de Educación Enrique Guzmán y Valle	23	11	34
3	Universidad Nacional San Luís Gonzada de Ica	5	-	5
4	Universidad Nacional del Altiplano- UNA	16	4	20
5	Universidad Nacional Federico Villareal	17	2	19
6	Universidad Nacional Hermilio Valdizán	6	-	6

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7	Universidad Nacional San Cristóbal de Huamanga	7	-	7
8	Universidad Nacional del Callao	6	2	8
9	Universidad Nacional del Centro	4	-	4
0	Universidad Nacional Pedro Ruiz Gallo	3	-	3
1	Universidad Nacional de San Antonio Abad del Cuzco	1	-	1
2	Universidad Nacional de la Amazonia Peruana	4	3	7
3	Universidad Nacional José Faustino Sánchez Carrión	13	2	15
4	Universidad Nacional San Agustín de Arequipa	2	-	2
5	Universidad Peruana Unión	5	1	6
Total		135	30	165

Selection Criteria

The sample is of non-probabilistic type, working with a total population of 165 university professors (135 men and 30 women).

Variables

The following were used: academic grade achieved, sex, age, research completed and it was considered as “publication” all public articles in a scientific magazine. Excluded were: Thesis, summaries for scientific conferences and books, and it was classified as an “article” if it presented the following sections: introduction, method, results, discussion, and conclusions or its equivalents, also if they belong to RENACYT as researchers.

Instruments

The instrument used was the data collection file validated by one research professor with experience in scientific publications.

Procedures

The identification of the academic grade and the category of research professors were done at the portal for University’s Superior Education National Superintendence (SUNEDU) in Peru, later they were verified at the national registry of grades and titles and at the Science,

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Technology, and Technological Innovation National Registry (RENACYT), part of the National Science Technology and Innovation Council (CONCYTEC). To verify their ages, the full name and last name of the Physical Education Professors were used through the accreditation query system at the Health Social Security Es-Salud <http://ww4.essalud.gob.pe:7777/acredita/> so that later we could search for publications. After obtaining their ages, the identifying data was erased.

The inquiry for scientific publications was done at Scopus's database and at Academic Google's search engine, for which we used a combination of the names and last names adding Peru to each of the databases: "Last name 1-Last name 2" Peru; "Name 2 Last Name 1" Peru; "Name initial Name 2 Last name 1" Peru. The number of publications during their career was considered and the publications between the years 2006 to May 2020.

The homonymy problems were resolved according to the country, city or institution of affiliation of the authors, as well as the use of ORCID (Open Research and Contribution ID): is a unique identifier that has as its principal purpose to provide researchers a persistent and unequivocal code that clearly distinguishes their scientific work and avoids confusions linked with scientific authorship and the existence of matching or similar personal names.

Statistical Analysis

For the statistical process, a descriptive analysis of frequencies and percentages were used and measurements of central tendencies.

Biometric considerations

Concerning biometric aspects, the present study guarded the confidentiality of the data. Also, there was an anonymous list to do the statistical analysis.

Table 1. Characteristics of the Physical Education graduates, masters, and doctors at Peruvian Universities.

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Variables		Teachers with ... n (%)			
		Professional title	Master	Doctor	Total
Sex	Female	10 (33.33%)	11 (36.67%)	9 (30.00%)	30 (100%)
	Male	28 (20.74%)	61 (45.19%)	46 (34.07%)	135 (100%)
Age	Female	$\bar{X}63.20 \pm 9.57$	$\bar{X} 49.27 \pm 7.77$	$\bar{X} 54.78 \pm 9.34$	$\bar{X}55.75 \pm 0.80$
	Median	65	52	57	
	Minimum age	39	34	42	
	Maximum age	75	58	66	
	Male	$\bar{X}62.75 \pm 9.87$	$\bar{X}54.52 \pm 10.09$	$\bar{X}55.19 \pm 10.17$	$\bar{X}57.49 \pm 3.73$
	Median	64	53	56	
	Minimum age	44	34	26	
	Maximum age	77	74	78	
Published in...	Scopus	No	No	Yes, 5 (100%)	
	Web of Science	No	Yes, (9.09%)	1 Yes, (90.91%)	10
	Pub Med	No	No	Yes, 9 (100%)	
	Scielo	No	No	Yes, 2 (100%)	
	Latindex	No	Yes, (33.33%)	1 Yes, 2 (66.67%)	
Researchers and teachers	Male	No	No	Yes, (3) (1.82%) No, 162 (98.18%)	165 (100%)

Of the 165 Physical Education professors with graduate, masters and doctorate studies, enrolled in the title registry at (SUNEDU) Peru, in males, 45.19% (61) have masters, 34.07%

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(46) doctors, and 20.74% (28) graduate degree, in comparison with females, 36.67% (11) masters, 33.33% (10) graduate, and 30% (9) doctors. According to the University Law, article 82 points out that to work as a university professor they must have a master's degree to teach undergraduate level. In the same manner, the average age of male professors (57.49 ± 3.73), women (55.75 ± 0.80), and 1.82% (3) professors with a doctor's degree have the certification as researchers from (RENACYT) Peru.

On the other hand, it is shown that the maximum productivity age is 58 in the case of female researchers and 57 in the case of male researchers and that teamwork activities are continuously increasing amongst researchers (Rodríguez, et al., 2017)

Professors that show a higher preference for research are much younger while older professors show a higher preference for teaching. This can be explained by the fact that presently, research is more important for a university professor's career (accreditation to be able to work as a professor and promote research stretches, teaching reductions to be able to dedicate more time to research...) something that did not occur with the same intensity in previous years (Tesouro and Puiggalí, 2015).

Along the same lines, promoting scientific investigation to students by their professors could increase accomplishing fieldwork which could benefit different populations being studied. In consequence, it is proposed that professors develop lines of research according to their specialty and level of experience, in which the students could start their journey into research, taking into account that the professor's influence is essential to eradicate apathy which affects undergraduate students and could enlarge their research horizons (Rios, De Benedictis and D'Amico, 2019).

Women's reports and leadership in Peruvian scientific publications are still quite small and stagnant in time. Therefore, collaboration and training networks should be created that are more inclusive of women, to support and give sustainability to their growth (Centeno,

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Morales, Lopez and Mejia, 2020). Thus, the need to establish Gender and Sex Equity Guidelines for Research (SAGER) which are mainly designed to help male and female authors in producing their manuscripts, but are also helpful for male and female editors, as guardians of science, to incorporate the evaluation of the existence of men and women and gender perspective in all manuscripts as an integral part of the editorial process (Heidari, Babor, De Castro, Tort and Curno, 2019).

Table 2.

Scientific production by Peruvian Universities that offer Physical Education Study Program for the period 2006-2020

Journals indexed	UNMSM		UNEGYV		UNA		UNSCH		TOTAL	
	f	%	f	%	f	%	f	%	f	%
Scopus	2	25.00	16	55.17	7	25.00	0	0.00	25	37.31
Web of Science	6	75.00	4	13.79	12	42.86	1	50.00	23	34.33
Pub Med	0	0.00	9	31.03	0	0.00	0	0.00	9	13.43
Scielo	0	0.00	0	0.00	6	21.43	1	50.00	7	10.45
Latindex	0	0.00	0	0.00	3	10.71	0	0.00	3	4.48
Total	8	100.00	29	100.00	28	100.00	2	100.00	67	100.00

Universidad Nacional de Educación Enrique Guzmán y Valle (UNEGYV) presented the highest percentage of scientific articles in Scopus (16) 55.17%, PubMed (9) 31.03%, Web of Science (4) 13.79%; followed by Universidad Nacional del Altiplano (UNA) in Scopus (7) 25%, Web of Science (12) 42.86%, Scielo (6) 21.43%, and in Latindex (3) 10.71%; Universidad Nacional San Cristóbal de Huamanga (UNSCH) has published in Web of Science and Scielo (1) article in both cases representing 50%. Peruvian professors recognized as investigators by RENACYT belong to Universities (UNEGYV), (UNA) and (UNMSM), and the professor with the highest H-index belongs to (UNEGYV) with (H-index: 6).

In the same manner, Candia, Ortíz, de León, Carrasco, and Gutierrez (2019) pointed out that the use of systematic revisions for analyzing scientific production of higher education institutions could be a very useful tool to take institutional decisions in research subject matters.

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Regarding the above, the publication rate by professors that assessed a thesis in a Health Science Faculty in Peru and the publication rate of thesis advisors for Psychology graduates at the University, in both cases is low and worrisome, which evidences great limitations concerning research competence of advising professors. Furthermore, it revealed that a great part of those involved still holds a graduate degree which unveiled a lack of education and training in scientific research (Mamani, 2019; Mamani, Ventura and Caycho, 2019).

Analogously, it is required to build a true scientific culture within the university community, the demystification of the scientific figure as a rare individual, brilliant, that is to say, as an unreachable model, besides promoting collaborative research, creating individual, group and institutional strategies for scientific publications, permanent and systematic training, and a greater stimulus by the organizations that control the quality of education (Barriga, Barbón, Buenaño and Barriga, 2018).

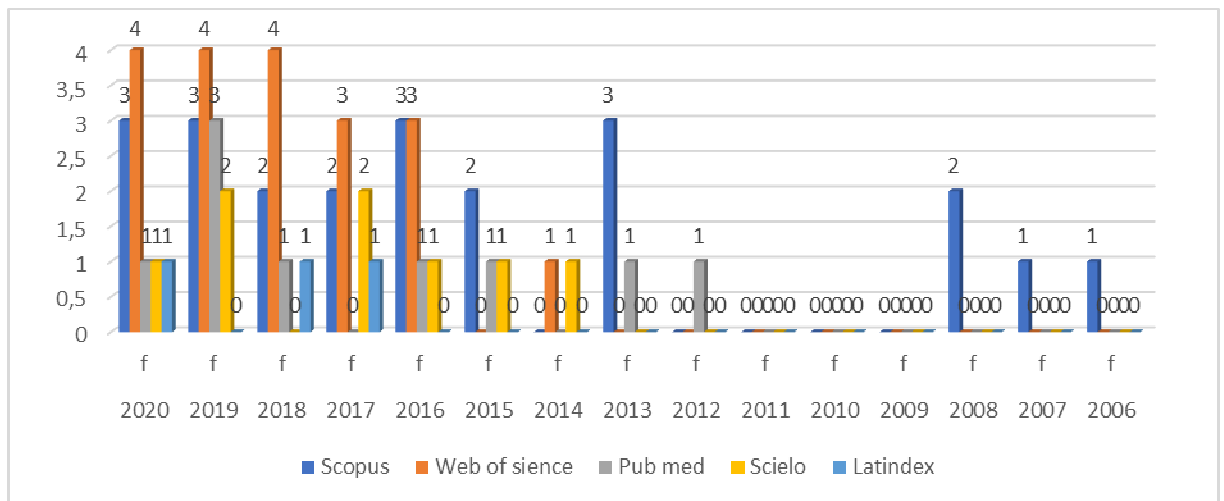


Figure 1. Scientific production per year by Physical Education University Professors in Peru, Years 2006-2020

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Scientific production started in 2006 and 2007. Both years (1) article was published in Scopus; 2008 (2) in Scopus; later there is an absence of publications between 2009 and 2001; in 2012 (1) in PubMed; in 2013 (3) in Scopus and (1) in PubMed; in 2014 (1) in Web of Science and Scielo, in 2015 (2) Scopus and (1) in PubMed and Scielo; 2016 (3) in Scopus and Web of Science, and (1) in PubMed and Scielo, 2017 (3) in Web of Science, (2) in Scopus and (1) PubMed and Latindex; it significantly increases in 2019 (4) in Web of Science, (3) in Scopus and PubMed and (2) in Scielo and in 2020 (4) in Web of Science, (3) in Scopus and (1) in PubMed, Scielo, and Latindex.

On the other side, (Reverter, Hernández, Jové and Legaz, 2016) pointed out that magazines, where more Spanish professors publish, are *Medicine and Science in Sport and Exercise* and *Archives of Sport's Medicine* within the Physical Education area and at *International Medicine and Science of Physical Activity and Sports Magazine* within the Corporal Expression Education area. The results show that the mean values of (h) Index are much higher in Scopus.

Barbón, Barriga, Cazorla, and Cepeda, (2018) validated that the academic personnel with the highest number of publications has around 15 to 30 hours per week assigned to research projects and scientific production. Moreover, higher commitments are necessary to better strengthen research practices and with it, improve teaching, so later appropriations can be achieved for this phenomenon, in the best sense (Casimiro, Casimiro, and Casimiro, 2017).

Similarly, (Gonzales, et al., 2018) concluded that scientific production at the Faculty of Medicine at Universidad Nacional de Trujillo in MEDLINE /PubMed and Scopus was low. It is necessary to implement strategies that promote scientific production by involving students, professors, authorities, and graduates, as well as establishing collaboration networks that complement the strategies implemented by CONCYTEC.

Equally, Valles (2019) pointed out that to increase scientific production a new management model is required, based on three pillars: institutionality, to guarantee the

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adoption of this model at the university; management of the research itself, seeking to strengthen competition to publish scientific articles; and administrative management, to ensure the logistic and operational conditions for the execution of the research projects.

Discussion

Scientific production is an indicator of knowledge generated by the institutions and its dissemination of the most immediate and active form of communication with the scientific community. The essential would be to find graduates, masters, and doctors with research experience. The results of our study do not reflect that Physical Education University Professors are performing scientific investigation as part of their teaching duties. Where the highest percentage of research was done (5) doctors with 25 publications in Scopus, 10 in Web of Science, 9 in PubMed, 2 in Scielo, and 2 in Latindex. 1.82% (3) professors had the research professor certification recognized by (RENACYT) in Peru.

We concur with (Mejía, Valladares and Valladares, 2018) where they point out: very few masters (40% and 15%) and doctors (33% and 11%) have published in Academic Google and Scopus respectively. Those that had a masters and a doctorate had higher publication frequencies of original articles in Academic Google (RPc: 1,52; IC 95%: 1,05-2,21; value p = 0,028), publishing any research in the last five years (RPc: 1,58; IC 95%: 1,01-2,46; value p = 0,046) and publish original articles (RPc: 1,77; IC 95%: 1,11-2,84; value p = 0,017). Doctors had a higher frequency of publishing original articles in the last five years (RPc: 1,59; IC 95%: 1,03-2,47; value p = 0,037).

On the other hand, (Barriga, et al., 2018) refer that the impact of a Research Experimental Training Program, which favors the exchange of research practice experiences and topics requested by the participants, increased significantly the production of presentations, of revised scientific articles, of original articles and the publication of articles at indexed magazines.

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In Spain, the collaboration networks are multicenter and multi-disciplinary, involving several groups or communities with similar objectives, maximizing the use of resources, favoring competitiveness and research production: however, the creation of professor's scientific training networks still constitute a pending task, on one side, the development of strategies to publish their scientific work in academic magazines and on the other, recognizing the central role played by the difficulties producing scientific articles and their ties with their origin to ponder their potentiality (Barbón, et al., 2019; Fernández, et al., 2003).

Conclusions

It's concluded that the frequency of publications by Physical Education University Professors in Peru with graduate, master, or doctor's degrees is very low. Politics need to be implemented, destined to change the indicators of scientific production in this group of postgraduate professors. Similar studies should be made in professor's populations with masters and doctorate degrees where scientific publications directly derived from their master and doctorate thesis are evaluated and examined, to establish comparisons with other countries, analyzing the factors involved in low rates of publications in this professor's population.

Limitations

The limitations we encountered were that the results only considered professors registered at (SUNEDU) in Peru and it was known that there could be other professionals with non-standardized degrees and not registered that could have important scientific publications. Another limitation was not considering the variable which mentioned that the master or doctorate degrees were obtained at the national or international level. Despite these limitations, the results are important, because they reflect the reality of scientific production shown by Physical Education University Professors in Peru.

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